

SCANNING PROBE MICROSCOPY TIPS COMPOSED OF NANOPARTICLES AND METHODS TO FORM SAME

ABSTRACT

A structure and method for improving the spatial resolution of a scanning probe microscope (SPM) tip, which has been coated with a layer of chemically-synthesized nanoparticles. The nanoparticles are either single-species or heterogeneous, such that the single-species nanoparticles can be either ferromagnetic, paramagnetic, superparamagnetic, antiferromagnetic, ferrimagnetic, magneto-optic, ferroelectric, piezoelectric, superconducting, semiconducting, magnetically-doped semiconducting, insulating, fluorescent, or chemically catalytic. The layer of nanoparticles is at least two nanoparticles thick, or alternatively, is a single layer of nanoparticles thick, or alternatively, is a single layer of nanoparticles thick and covers only the tip apex portion of the tip, or alternatively, only a single nanoparticle is affixed to the tip apex. Alternatively, the layer of nanoparticles is transformed into an electrically-continuous magnetic film by annealing at a high temperature.